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STATE OF ALASKA

William A. Egan, Governor



ANNUAL REPORT OF PROGRESS, 1963 - 1964

FEDERAL AID IN FISH RESTORATION PROJECT F-5-R-5

SPORT FISH INVESTIGATIONS OF ALASKA

ALASKA DEPARTMENT OF FISH AND GAME

Walter Kirkness, Commissioner

E. S. Marvich, Deputy Commissioner

Alex H. McRea, Director

Alaska, Sport Fish Division

Louis S. Bandirola, Coordinator

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INTRODUCTION

This report of progress consists of Job Segment Reports from the State of Alaska Federal Aid in Fish Restoration Project F-5-R-5, "Sport Fish Investigations of Alaska."

The project is composed of 25 separate studies designed to evaluate the various aspects of the State's recreational fishery resources. Of these, eight jobs are designed to continue the cataloging and inventory of the numerous State waters in an attempt to prepare an index of the recreational waters. Four jobs are designed for specific sport fishery creel census while the remainder of the jobs are more specific in nature. These include independent studies on king salmon, silver salmon, grayling, Dolly Varden, a statewide access evaluation program, egg take program and a residual toxaphene study. The information gathered from the combined studies will provide the necessary background data for a better understanding of local management problems and assist in the development of future investigational studies.

The subject matter contained within these reports is often fragmentary in nature. The findings may not be conclusive and the interpretations contained therein are subject to re-evaluation as the work progresses.

JOB COMPLETION REPORT

RESEARCH PROJECT SEGMENT

STATE: ALASKAName: Sport Fish Investigations
of Alaska.Project No: F-5-R-5Title: Investigations of the Upper
Southeast Alaska Salt Water
Sport Fish Harvest.Job No: 2-DPeriod Covered: May 16, 1963 to October 30, 1963.

Abstract:

A creel census program was conducted from May 4 to September 16 to measure the salt water harvest of sport fish in the Juneau area. The investigation includes the catch of the commercial strip fisherman as well as the strictly sport angler.

A total of 6,870 salmon, representing 2,506 boat trips, was sampled during the regular fishing season. In addition, 1,440 fish were sampled during the annual salmon derby. Pertinent fishery and biological data were collected and recorded from this catch. Information is presented on the seasonal timing and distribution of various species within the fishery.

It is estimated that 5,332 boat trips during the regular season resulted in 14,558 salmon, a success rate of 2.74 salmon per trip.

Recommendations:

That the study be continued.

That the census be adapted to a statistical design that would improve the efficiency of the census crew.

That studies be initiated to determine the origin and migration patterns of the local king salmon stocks.

Objectives:

To obtain an estimate of the species and number of sport fishes harvested from salt water in the Juneau area.

To obtain an index of sizes and age classes of these salt water fishes.

To determine the need for future management procedures and to direct the course of such studies.

Techniques Used:

Background information from prior studies conducted by the Alaska Department of Fish and Game was reviewed and utilized during the investigation.

The principal boat landings in the Juneau area were surveyed in a manner producing the maximum number of fishermen interviews.

The census was active on all weekday evenings and during weekends. The investigation was discontinued only during extremely stormy weather.

Weather conditions and fish migration patterns were considered in the selection of sampling areas and in the timing of the sampling.

Airplane surveys of the fishing grounds were made throughout the season in an effort to determine the number of boats not contacted during the census period. In addition to the aerial counts, boats were also counted from the water by skiff.

Length, weight, sex, flesh color, maturity and scales were collected from the sport fish species when possible.

The location of each catch was determined as close as possible.

The length of time spent fishing, information on equipment and fishing techniques were collected from each fisherman as part of every interview.

Recommendations are made for management measures and to direct the course of future studies.

Findings:

During the past three years, considerable emphasis has been placed on gathering information concerning the salt water harvest of sport fish in the Juneau area. The importance and demand on this recreational fishery can be realized by noting the increased number of pleasure boats in the local moorages.

With this greater fishing pressure comes the need for additional information concerning the proper management of these waters. Since the local salmon stocks are of prime importance it is this area which demands the most attention. It is only by the collection and research of facts that a sound management program can result.

During the 1963 season a creel census similar to those of past years was conducted on the Juneau sport fishery to supply this needed information.

Seasonal Catch Success and Fishing Effort

The creel census, which was active from May 4 to September 16, measured nearly all the effort on the Juneau sport fishery. A total of 6,870 salmon was recorded taken by 5,350 anglers during this period (TABLE 1). An additional 1,440 salmon were sampled during the Golden North Salmon Derby. Derby fish are treated separately in this report and are not used to compute seasonal catch per unit of effort. Sport and commercial strip fishermen made 2,506 boat trips in the Juneau area, which resulted in a seasonal catch of 2.74 salmon per boat trip. This success rate is the highest recorded since the investigation was initiated in 1960.

Commercial strip fishermen are defined as those fishermen who use pleasure type boats and sport tackle, but who possess a commercial fishing license and may sell their fish. A commercial license allows the fisherman to use as many as four fishing rods at one time and removes the number limit on king salmon. Sport anglers are restricted to a single rod and to three king salmon daily. No size or possession limit is currently in effect on the other species of salmon.

A comparison of the sport and commercial strip fishermen showed that the commercial strip fishermen caught more fish with six times as great a catch per boat trip. Several factors appear responsible for this greater commercial strip catch; they are permitted to use more than one rod, they fish long hours and are generally the more skilled fishermen

TABLE 1. The Numbers of Fish, Boats and Catch per Boat During the 1963 Season, Juneau Area.

<u>Type</u>	<u>Species</u>	<u>No. Fish</u>	<u>CPUE*</u>
SPORT (1919 Boats)	King	1,054	0.55
	Coho	1,363	0.71
	Pink	74	0.04
	Chum	25	0.01
	TOTAL	2,516	1.31
COMMERCIAL STRIP (587 Boats)	King	1,342	2.28
	Coho	2,908	4.95
	Pink	76	0.13
	Chum	28	0.05
	TOTAL	4,354	7.41
COMBINED SPORT & COMMERCIAL STRIP (2506 Boats)	King	2,396	0.96
	Coho	4,271	1.70
	Pink	150	0.05
	Chum	53	0.02
	TOTAL	6,870	2.74

*Catch Per Unit of Effort Per Boat Trip.

The seasonal sport catch of king salmon as based on the 1,919 boats interviewed was 1.054 fish. This resulted in a catch per boat trip of 0.55. The commercial strip fishermen enjoyed a greater success with 1,342 king salmon being caught during 587 boat trips, a seasonal success rate of 2.28 fish per boat trip.

The seasonal catch per boat trip for coho salmon was 0.71 for sport anglers while the commercial strip fishermen had a catch per unit of effort of 4.95. It should be noted that the catch per boat trip for this species would

be much greater if computed for the period of availability and not on a seasonal basis.

The recorded fishing effort for the season (excluding Derby), as based on the 4,694 sport and 655 commercial strip anglers contacted, was 30,513 man hours. This resulted in one salmon per sport angler for every 10.77 hours of effort, while the commercial strip fisherman boated a salmon every 1.43 hours. The heaviest fishing pressure (65 per cent), as measured by the number of boats fishing, occurred during weekends. This weekend effort is further emphasized in that weekend anglers fish approximately three times as long per outing as do the weekday fishermen.

Estimated Seasonal Harvest

The numerous boat harbors and private moorages used by the Juneau sport fishermen precluded complete angler contact. In an effort to obtain maximum sampling coverage, census clerks were employed only at the major boat landings. To determine what portion of the fishing effort was sampled the fishing grounds were surveyed by aircraft on weekends throughout the season. Boat counts were also made from the water by skiff during weekdays. These counts indicated that the census was sampling 47 per cent of the total fishing effort. With this coverage the expanded regular season catch is estimated to be 14,558 salmon taken during 5,332 boat trips. The 1,440 salmon sampled during the Derby are believed to nearly represent the total harvest for the event. Combining the two catch figures yields an estimated seasonal harvest of 15,998 salmon (TABLE 2).

TABLE 2. Estimated Salmon Harvest During the 1963 Fishing Season, Juneau Area.

<u>Species</u>	<u>Regular Season</u>		<u>Commercial</u>	<u>Estimated</u>
	<u>Sport Harvest</u>	<u>Derby</u>	<u>Strip Harvest</u>	
King	1,054	617	2,396	5,657
Coho	1,363	695	4,271	9,782
Pink	74	115	150	434
Chum	25	12	53	124
Sockeye	<u>0</u>	<u>1</u>	<u>0</u>	<u>1</u>
TOTAL	2,516	1,440	6,870	15,998

*The 1,440 fish caught during the Juneau Salmon Derby were added to the expanded regular season harvest.

King Salmon

The most popular salt water fish in the local waters is the king salmon. This highly prized species is eagerly sought by the sport angler for its excellent fighting ability and large size. The bulk of the seasonal harvest, however, is not composed of large fish, but consists primarily of immature individuals referred to as "feeders." Gonad examination indicated that approximately 85 per cent of the catch consisted of immature feeders. These feeding populations are present in the fishery throughout the year.

A review of past commercial statistics indicates a definite decline in Southeastern Alaska king salmon stocks. Data concerning the local sport harvest are not yet extensive enough to reveal changes in abundance, but local anglers claim the species is not as plentiful as in former times. Before any attempt can be made to determine the causes for such a decline, information must be obtained concerning the origin of the local stocks. Loss of spawning and rearing areas is often the primary cause for declining king salmon runs. Until information regarding the natal streams is obtained it seems questionable that a reduced harvest would benefit the Juneau sport fishery.

The 1963 king salmon harvest of 2,396 fish was the highest recorded since the study was initiated (TABLE 3). The seasonal success per boat trip was also the highest on record. Although the catch significantly increased it is not directly comparable to past seasons for several reasons: Prior to 1963, the sport fishing limit for king salmon was 26 inches fork length minimum size and a fifty pound and one king salmon, or three king salmon, whichever was least restrictive. In 1963 this restriction was changed to a straight three fish limit without the minimum size limit. Commercial regulations remained unchanged (king salmon over 26 inches in length or 6 pound dressed weight) for the season except for a local closure between May 25 and June 17. During this period the sport limit was reduced to two king salmon daily.

The removal of the size limit on sport caught king salmon significantly increased the harvest. Length data indicates that 17 per cent of the sport catch fell under 26 inches.

The three king salmon limit was obtained by few anglers during the course of the season. Census data indicated an estimated 48 limits; over half of which were taken when the catch was reduced to 2 fish daily.

It is difficult to measure the effect of the commercial closure on the seasonal commercial strip harvest. Since the closure occurred during the king salmon spawning migration and included 23 days of the census it is expected the catch was reduced by approximately 15 per cent.

TABLE 3. Catch Per Boat for Sport and Commercial Strip Fishermen for the Years 1960-1963.

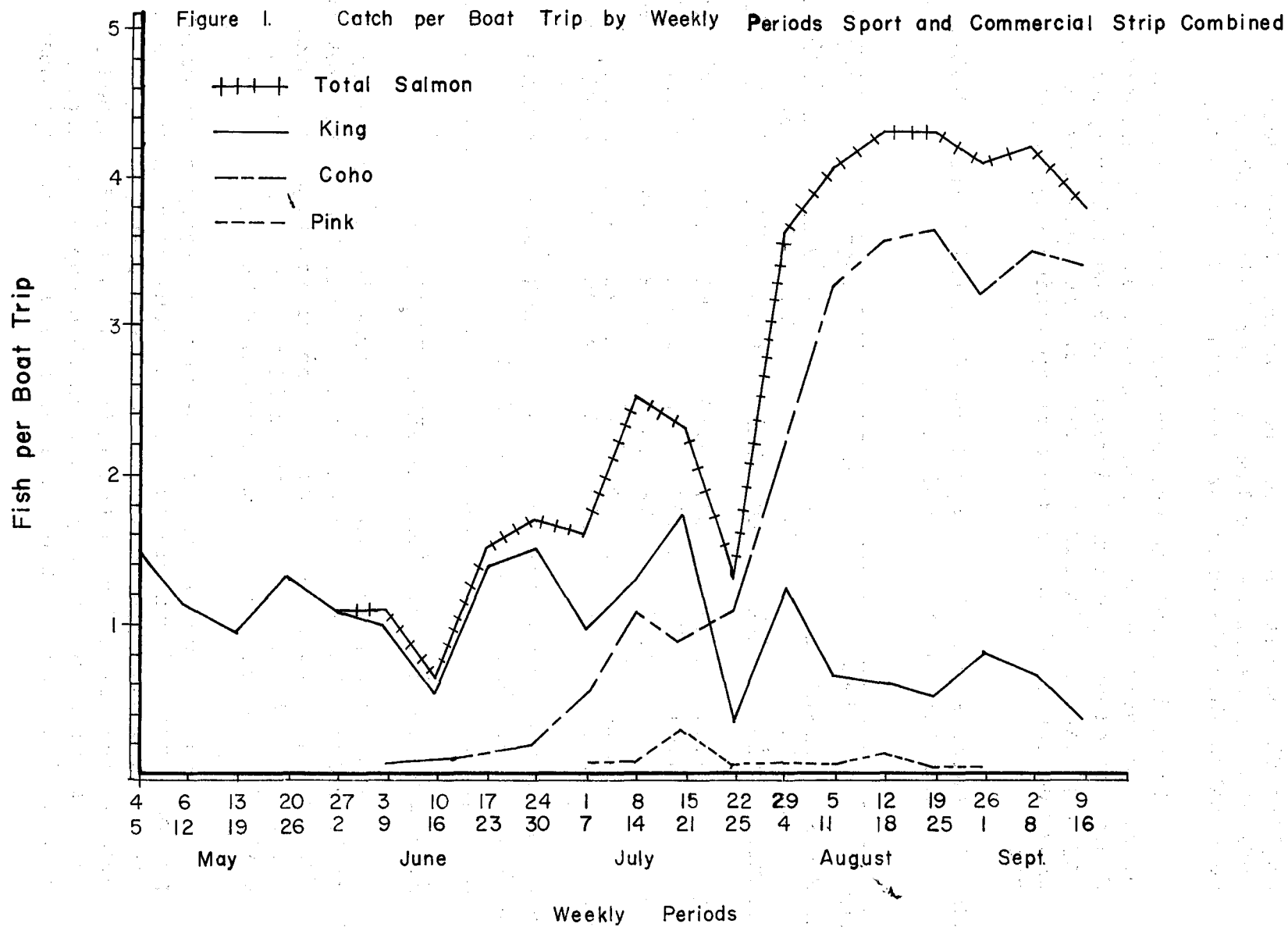
Year	1960		1961		1962		1963	
No. Boats	1,840		1,523		1,557		2,560	
Species	No. Fish	CPUE	No. Fish	CPUE	No. Fish	CPUE	No. Fish	CPUE
King	1,637	0.89	837	0.55	655	0.42	2,396*	0.95
Coho	1,442	0.78	1,104	0.72	1,641	1.05	4,271	1.70
Pink	97	0.05	78	0.05	68	0.04	150	0.05
Chum	16	0.01	18	0.01	31	0.02	53	0.02
TOTAL	3,192	1.73	2,037	1.34	2,395	1.53	6,870*	2.74

*Catch not directly comparable because of regulation changes.
CPUE = Catch Per Unit of Effort Per Boat.

Timing of the Various Species into the Fishery

King salmon were the only species landed in the sport fishery from the start of the census until the first week of June. Beginning in early June, coho salmon began to enter the catch. These species were followed in late June and early July by pink and chum salmon (FIGURE 1).

Fishing success for king salmon, as measured by catch per boat trip, demonstrated a steady decline from early May until a low was reached during the first week in June. Success increased during the middle of June and reached a seasonal high in mid-July. The catch dropped off rapidly in late July and reached its lowest level in mid-September.



Coho salmon entered the fishery in early June and increased in numbers until a peak was reached in late August.

Pink salmon entered the fishery in early July with peak success occurring in mid-July.

Chum salmon, although present in the fishery throughout much of the season, did not contribute significantly to the total catch.

Salmon fishing for all species, as indicated by catch per boat, reached a seasonal peak in mid-August (FIGURE 2).

Fishing Success by Area

The waters most heavily utilized by the Juneau anglers were divided into 18 separate areas (FIGURE 3). Areas close to boat harbors generally received the heaviest fishing pressure while more distant areas received little or no effort.

Areas 7, 12 and 15 received the greatest pressure while areas 4, 5 and 9 were fished lightly (FIGURE 4).

Fishing success by area for the 1963 season followed a pattern very similar to that recorded during past study periods. Early in the season (May and June) the heaviest fishing pressure occurred south of Juneau in the Taku Inlet (areas 17 and 18). Mature king salmon concentrate in these areas before moving to parent streams in the Taku River drainage. With the passing of these fish and the appearance of coho salmon in late June, fishing pressure shifted to more northerly areas adjacent to Portland and Shelter Islands.

Success by Boat Type, Gear and Method

The 16-20 foot cabin boat proved to be very popular with the Juneau anglers. This type boat accounted for 66 per cent of all king salmon and 72 per cent of all coho salmon landed in the local waters (FIGURE 5).

Large, inboard-powered cruisers accounted for more king salmon, but fewer coho salmon than the small, open

Figure 2 Catch per Unit of Effort by Weekly Periods

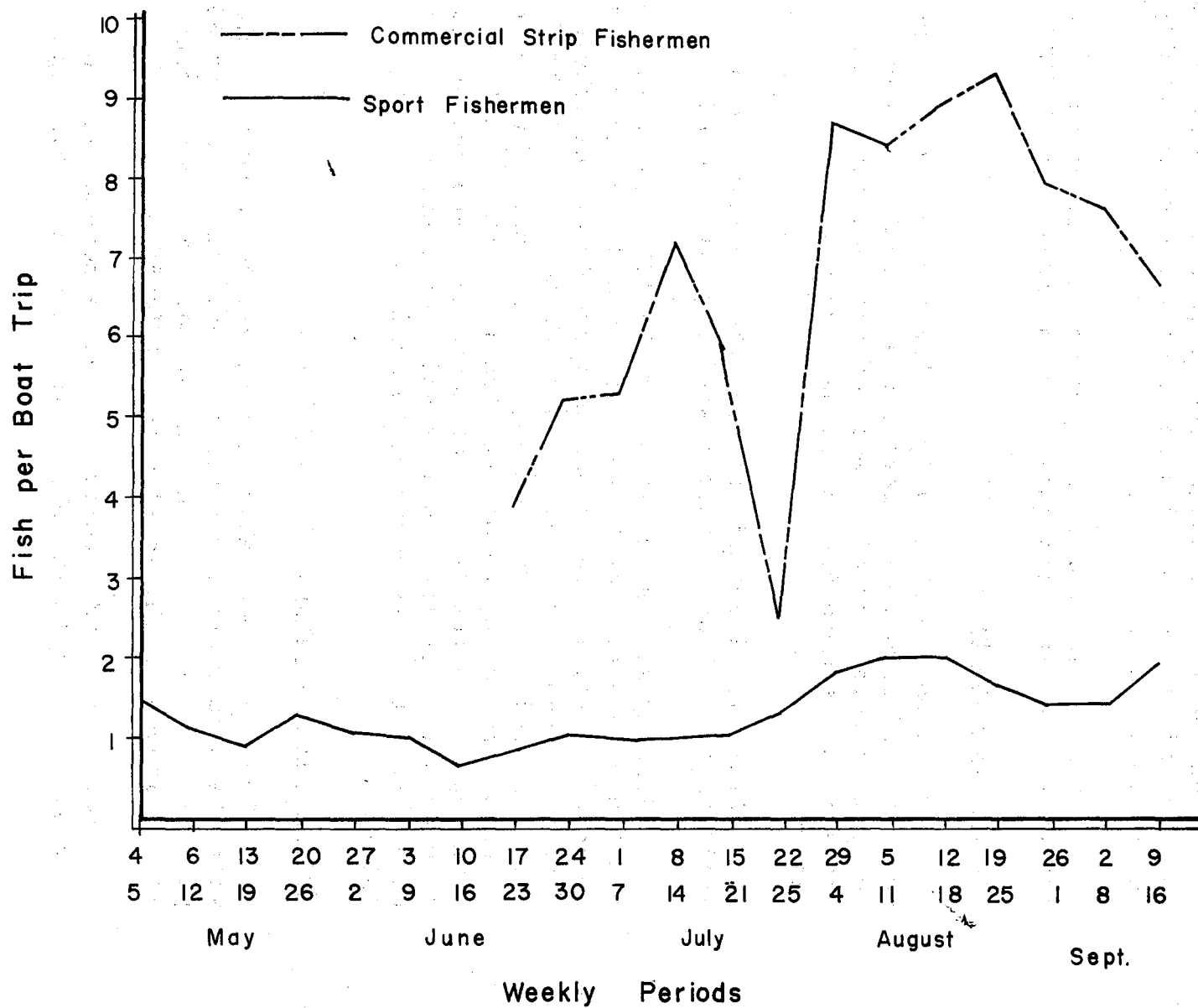




Figure 3. Areas covered during 1963 creel census.

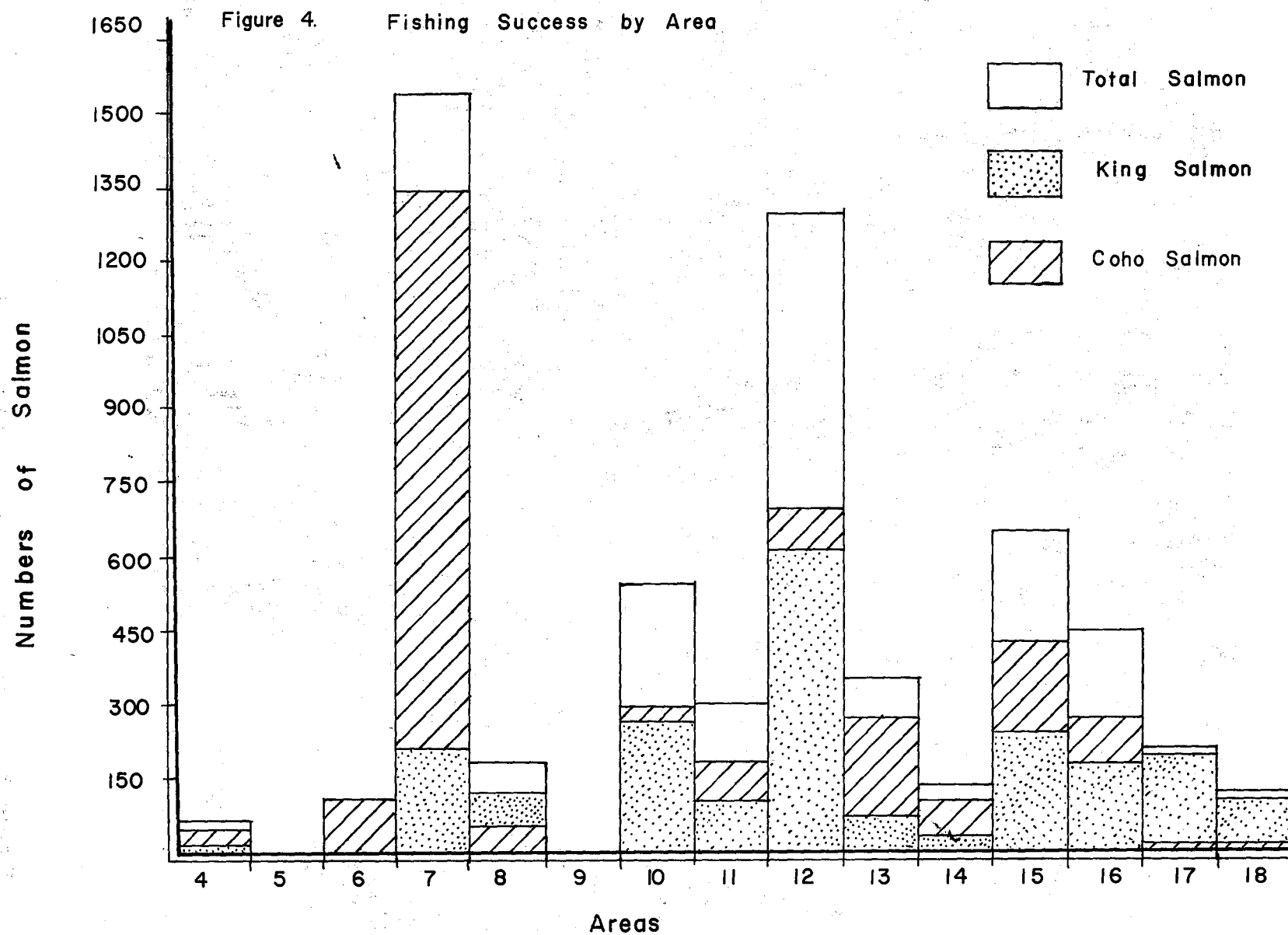
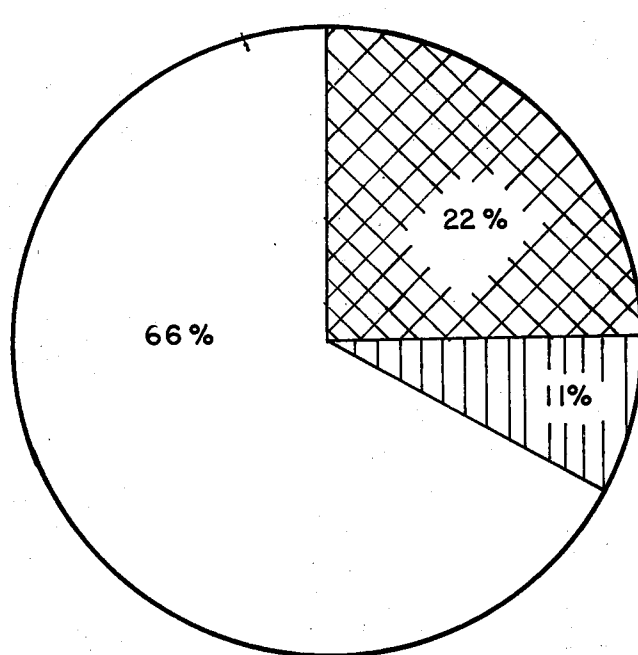
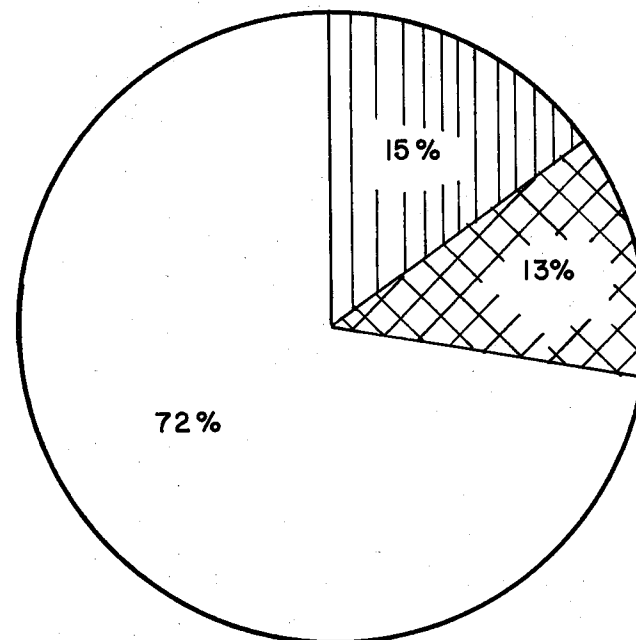


Figure 5 Per Cent of Catch Taken by By Boat Types
in the Juneau Area




King Salmon



Coho Salmon

 Cabin 16-20'

 Open < 20'

 Large Cabin > 20'

skiff. This may be explained in part by the ability of the larger boat to fish during the early king salmon run when the weather is often stormy. With the appearance of the coho salmon and improved weather conditions, greater numbers of small boats are used.

Fresh herring was superior to frozen herring as bait. The most popular and successful bait was strip-cut fresh herring. Whole and plug-cut herring were often used, but with less success (FIGURE 6). Artificial lures such as plugs, spoons and flashers are seldom used by the Juneau anglers.

The most popular fishing methods for catching salmon are ranked as follows: (1) trolling (steady motor use to provide action to the bait), (2) stripping (the use of strip-cut herring given action by the tide, rod or reel), (3) mooching (slow trolling or drifting combined), (4) a combination of the above methods. Trolling was by far the most successful method for catching coho salmon. For king salmon, the best methods were trolling and mooching (FIGURE 7).

Other Species

This segment of the study provided the first information concerning the harvest of halibut and Dolly Varden. During the census 681 halibut and 148 Dolly Varden were recorded. In most cases these fish were taken incidental to salmon. However, a small group of anglers prefer halibut and fish specifically for this species. Rockfish, lingcod and various species of greenling are also taken in small numbers. Unwanted species such as whiting, turbot and sculpins are also present in the local area. At times these pests harass anglers to such a degree that salmon fishing becomes extremely difficult.

Fish Sizes

From early May until mid-June large adult king salmon were prominent in the harvest. The catch during the remainder of the season was comprised largely of immature fish. FIGURE 8 indicates this gradual drop in size as the season progressed. Coho salmon enter the fishery as adults and continue to feed until entering the streams during the fall. A 2.5-inch length increase is noted from early July

Figure 6. Fishing Success By Gear Type

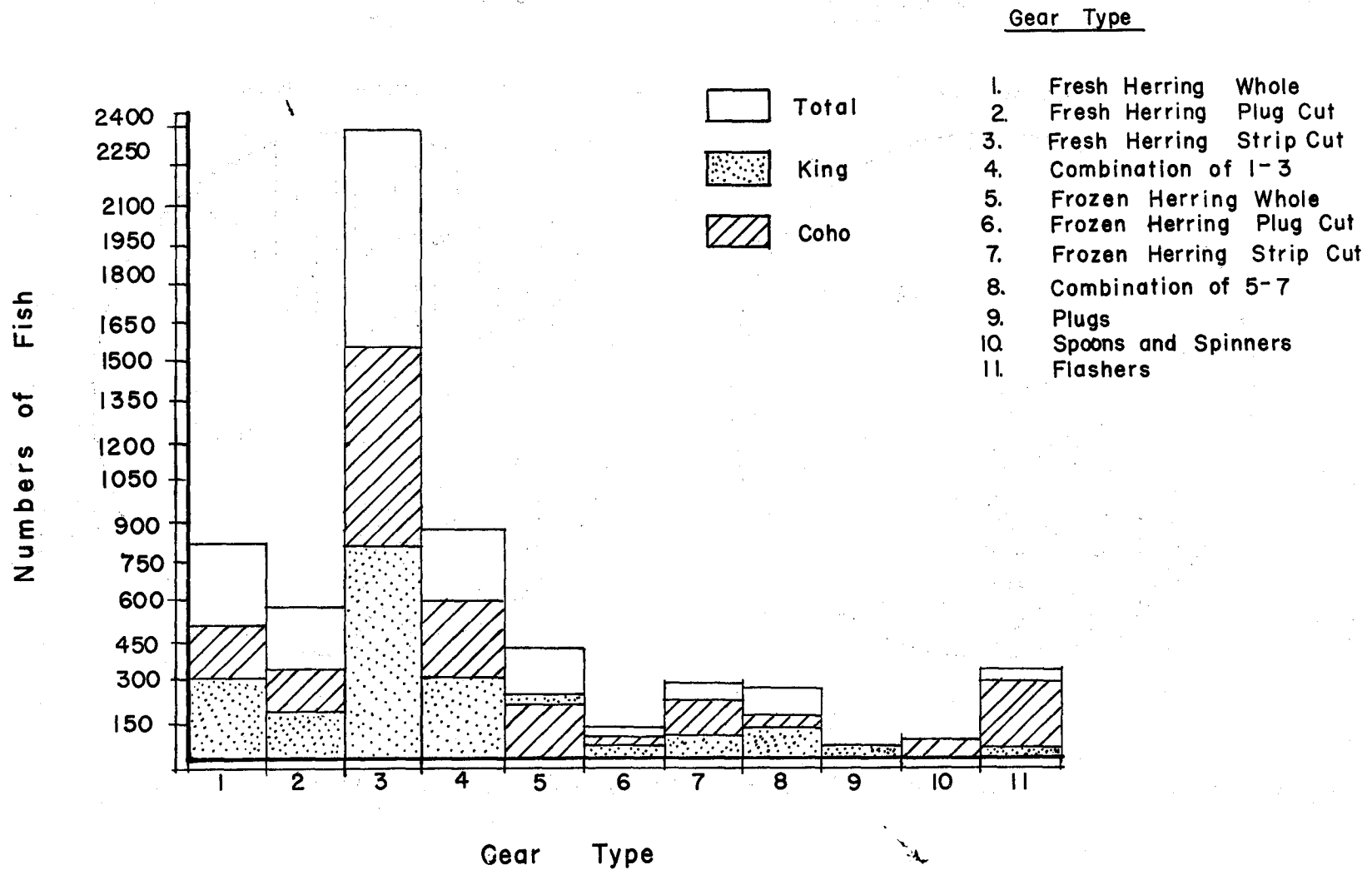
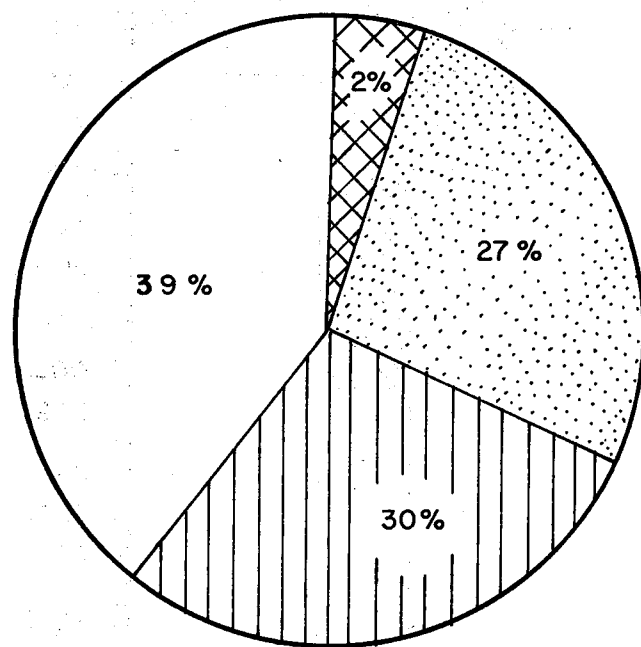
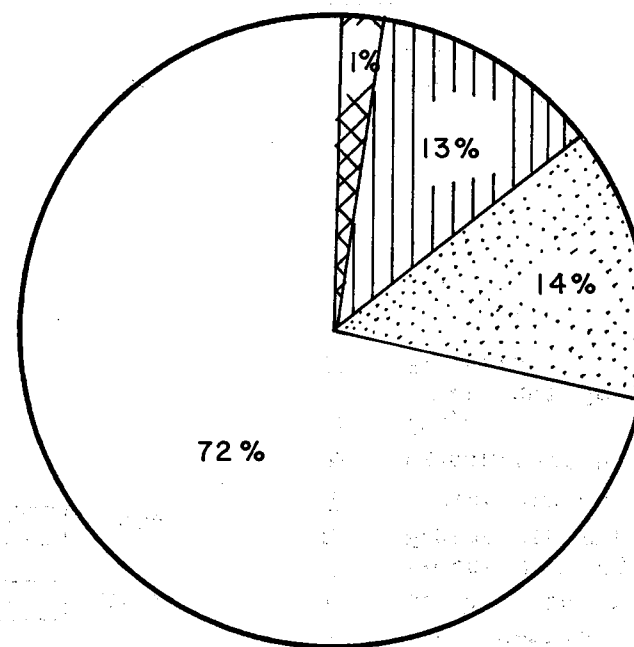


Figure 7. Per Cent of Catch Landed by Fishing Method in the Juneau Area



King Salmon



Coho Salmon

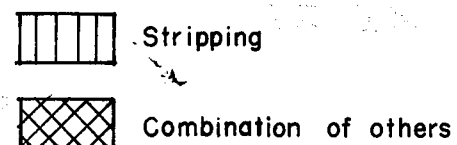
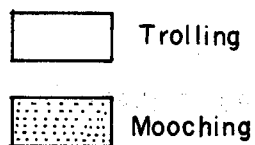
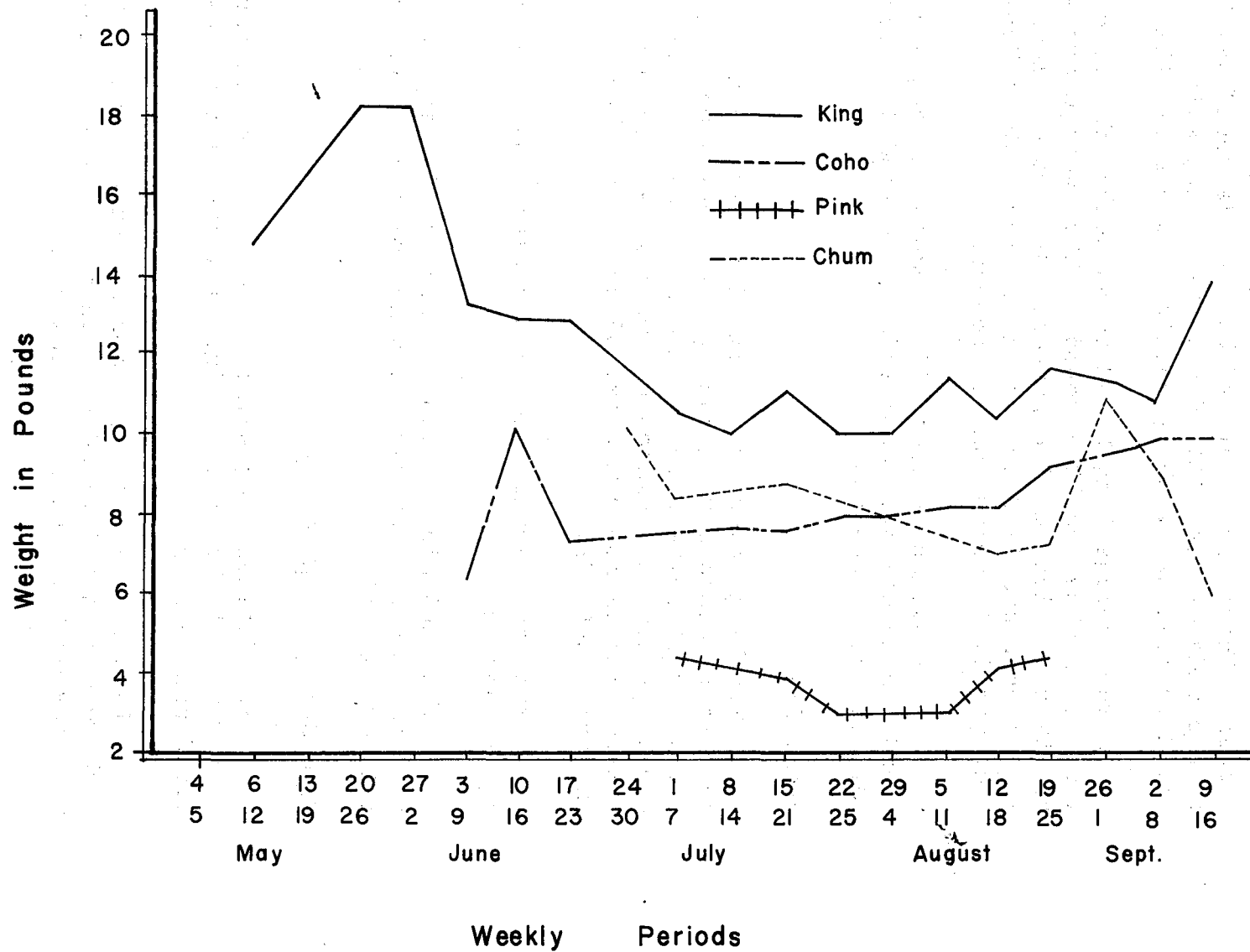


Figure 8. Weight of Dressed Salmon by Weekly Periods



until the middle of September (TABLE 4). Pink and chum salmon enter the fishery primarily as adults; therefore their average size remains fairly stable throughout the season.

The seasonal average king salmon length was 29.1 inches. These fish averaged 14.7 pounds round weight or 11.8 pounds dressed (TABLE 5). Male king salmon were found to average slightly shorter and heavier than females.

The average length and round weight for coho salmon was 27.7 inches and 10.4 pounds. The average dressed weight for this species was 8.6 pounds. Male coho salmon averaged 27.9 inches and 11.0 pounds in the round while females averaged 27.1 inches and 9.8 pounds.

Pink salmon averaged 22.0 inches in length and 4.8 pounds round weight. Chum salmon averaged 30.6 inches and 10.6 pounds in the round.

Sex Ratio

The king salmon sex ratio followed a pattern similar to that recorded during past years. Males were taken in the greatest numbers during the early season, but as the summer progressed females became dominant in the catch. Female king salmon comprised 56 per cent of the seasonal harvest (TABLE 6).

Male and female coho salmon were landed in almost equal numbers.

Chum and pink salmon entered the fishery in such small numbers that the sex ratio may not be indicative of the overall sex composition.

King Salmon Flesh Color

Red-fleshed king salmon were taken in greater numbers than white-fleshed fish. Fifty-six per cent of the catch was found to be red.

Late in the season, increased numbers of white-fleshed fish were caught (FIGURE 9). This corresponds closely with findings of the 1962 creel census season.

TABLE 4. Average Length and Round Weight of King and Coho Salmon by Week and Sex.

Weekly Period	Male King		Female King		Male Coho		Female Coho	
	Lgth.	Wt.	Lgth.	Wt.	Lgth.	Wt.	Lgth.	Wt.
<u>May</u>								
6-12	34.6	21.7	38.5	28.0				
13-19	38.3	30.9	35.4	22.2				
20-26	33.9	20.8	33.2	19.2				
27-2	28.3	12.1	29.5	17.0				
<u>June</u>								
3-9	30.3	13.4	31.1	19.1				
10-16	30.6	21.3	30.4	20.6				
17-23	29.8	14.4	31.7	17.5				
24-30	30.1	21.8	28.4	12.2				
<u>July</u>								
1-7	28.9	15.3	30.3	12.2	27.7	9.6	25.9	7.8
8-14	29.2	15.0	28.2	11.2	27.4	10.5	26.1	8.1
15-21	26.9	8.5	31.2	16.0	27.8	9.5	27.8	10.8
22-28	S A L M O N D E R B Y							
29-4	29.3	11.0	27.7	13.0	28.2	10.3	27.0	8.9
<u>August</u>								
5-11	29.7	13.5	31.8	16.0	27.6	11.9	27.3	9.0
12-18	24.0	6.0	28.1	8.3	27.8	13.1	27.2	10.5
19-25	27.0	9.7	24.6	6.5	28.1	10.2	27.9	11.9
26-1	29.1	10.5	29.4	11.5	28.4	12.8	27.9	10.0
<u>Sept.</u>								
2-8					29.1	12.2	28.3	10.9
9-16					30.2	12.7	28.5	10.7

TABLE 5. Average Length and Weights of Salmon for the 1963 Fishing Season, Juneau Area.

<u>Species</u>	<u>Average Length In Inches*</u>	<u>Average Round Weight in Lbs.**</u>	<u>Average Dressed Weight in Lbs.***</u>
King	29.1	14.7	11.8
Coho	27.7	10.4	8.6
Pink	22.0	4.8	4.1
Chum	30.6	10.6	8.3

*Length - Tip of snout to fork of tail.

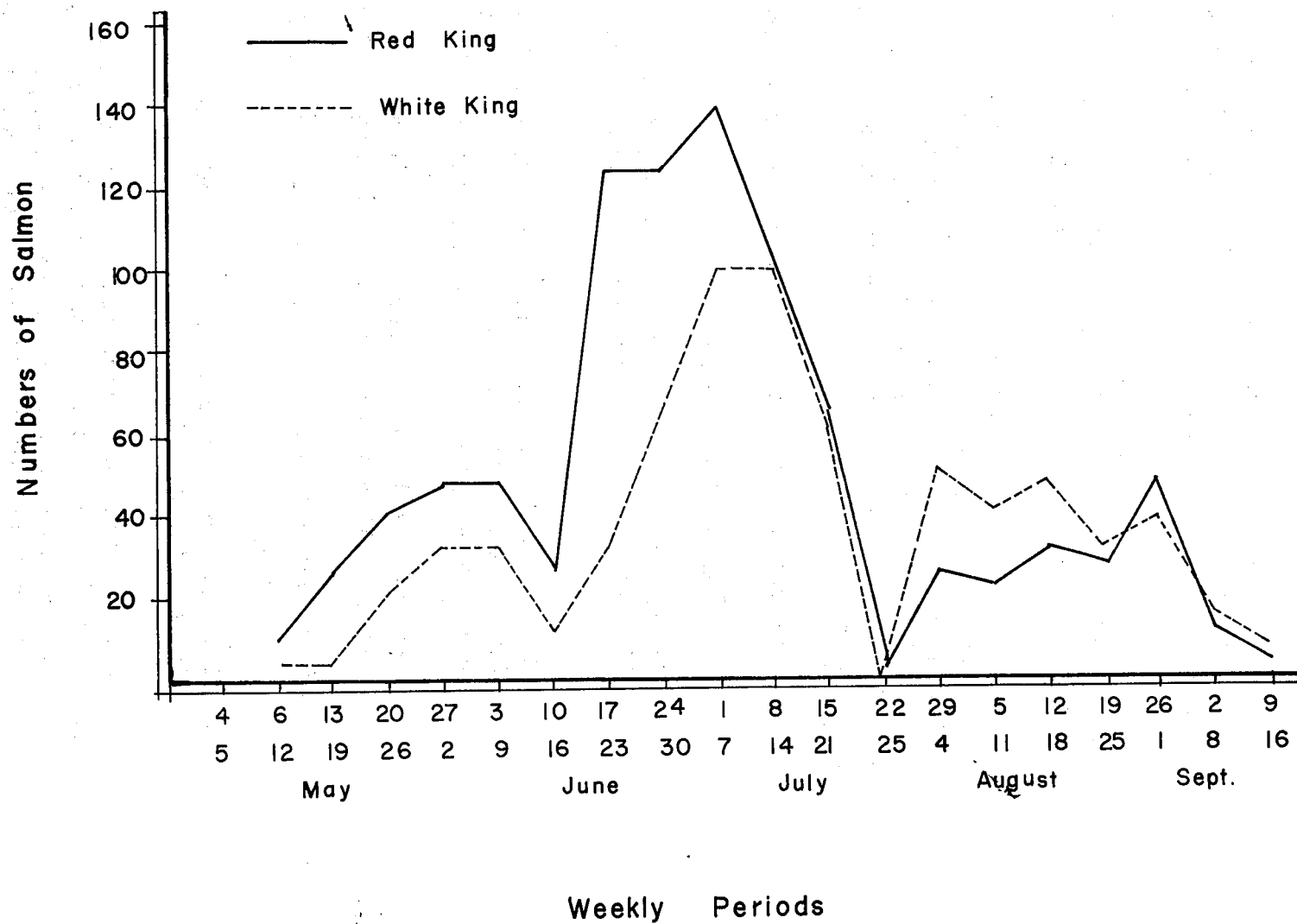
**Round Weight - Entire fish weighed.

***Dressed Weight - Head on; viscera removed.

TABLE 6. Sex Composition by Species for the 1963 Fishing Season, Juneau Area.

<u>Species</u>	<u>Sample Size</u>	<u>No. of Males</u>	<u>No. of Females</u>	<u>Per Cent Male</u>	<u>Per Cent Female</u>
King	498	221	277	44	56
Coho	482	264	218	54	46
Pink	34	8	26	23	77
Chum	8	4	4	50	50

Figure 9 Flesh Color of King Salmon By Weekly Periods



The economic importance of the red-fleshed king salmon is notable. The price paid to the commercial strip fishermen for these fish was almost double that paid for an equal sized white king salmon.

1963 Juneau Salmon Derby Results

The 1963 Golden North Salmon Derby, sponsored by the Territorial Sportsmen, Inc., was held on July 26, 27 and 28. The Derby was conducted in areas 7-16.

Boundaries were marked by red shore markers and patrolled by Derby officials. All contestants were required to comply with all local sport fishing regulations.

The Derby was conducted as in previous years with the boats leaving the starting line at 8:00 a.m. and returning to the dock at 6:00 p.m. Upon returning to the official weighing stations at Tee Harbor and Auke Bay, the fish were sampled for species, weight, length, sex and flesh color.

The results of the sampling are as follows:

A. Biological Factors

During the 3-day Derby 617 king, 695 coho, 115 pink, 12 chum and 1 sockeye salmon were recorded taken (TABLE 7).

King salmon averaged 12.0 pounds round weight and 28 inches fork length. The largest fish taken weighed 43 pounds, 15 ounces (TABLE 8).

The coho salmon sampled during the Derby averaged 9.2 pounds and 26.7 inches in length (TABLE 8).

Pink salmon averaged 4.7 pounds and 21.7 inches in length (TABLE 8).

Chum salmon averaged 10.3 pounds and 26.9 inches in length (TABLE 8).

King salmon sex composition was found to be 59 per cent female. The number of female king salmon landed in previous derbies has always been greater than the number of males. Sex composition of the

TABLE 7. Salmon Landed by Day and Location During the 1963 Juneau Salmon Derby.

<u>T E E H A R B O R</u>				
<u>Species</u>	<u>July 26</u>	<u>July 27</u>	<u>July 28</u>	<u>Total</u>
King	85	91	61	237
Coho	81	103	115	299
Pink	13	30	24	67
Chum	4	4	2	10
Sockeye	0	0	1	1

<u>A U K E B A Y</u>				
<u>Species</u>	<u>July 26</u>	<u>July 27</u>	<u>July 28</u>	<u>Total</u>
King	125	157	98	380
Coho	115	168	113	396
Pink	13	20	15	48
Chum	0	1	1	2
Sockeye	0	0	0	0

<u>C O M B I N E D</u>				
<u>Species</u>	<u>July 26</u>	<u>July 27</u>	<u>July 28</u>	<u>Total</u>
King	210	248	159	617
Coho	196	271	228	695
Pink	26	50	39	115
Chum	4	5	3	12
Sockeye	<u>0</u>	<u>0</u>	<u>1</u>	<u>1</u>
Total	436	574	430	1,440

TABLE 8. Lengths and Weights of Derby-Caught Salmon.

	<u>King</u>	<u>Coho</u>	<u>Pink</u>	<u>Chum</u>
Average Length (inches)	28.0	26.7	21.7	26.9
Average Weight (pounds) *	12.0	9.9	4.7	10.3
Number Sampled	615	695	115	12
* Round Weight				

TABLE 9. Sex Composition of Derby-Caught Salmon and Flesh Color of King Salmon.

<u>Sex Composition</u>	<u>King</u>	<u>Coho</u>	<u>Pink</u>	<u>Chum</u>
No. of Males	91	153	43	4
No. of Females	138	148	23	5
Per Cent Male	40	51	65	44
Per Cent Female	60	49	35	56
<u>Flesh Color</u>				
No. of Red	317			
No. of White	283			
Per Cent Red	53			
Per Cent White	47			

other species of salmon landed during the Derby are as follows: coho, 51 per cent female; pink, 35 per cent female; and chum, 56 per cent female (TABLE 9).

The flesh color of king salmon was found to be 53 per cent red.

King salmon less than 26 inches in length comprised 24 per cent of the catch for this species.

B. Fishery Factors

A total of 2,229 tickets was sold for the Derby and approximately 2,000 different individuals participated in the 3-day event. Entrants could purchase a ticket for one day, two days, or for the entire Derby. Because of the large number of participants and the fact that most converge on the weighing stations during the final hour each day, complete fishery factors were not obtained. The calculated catch per angler for all 3 days was 0.72 salmon.

TABLE 10. Success of Juneau Salmon Derbies for the Years
1959 - 1963.

<u>Species</u>	<u>1959</u>	<u>1960</u>	<u>1961</u>	<u>1962</u>	<u>1963</u>
King	599	361	221	226	617
Coho	862*	650	551	490	695
Chum		19*		10	12
Pink				7	115
Total	1,461	1,030	772	733	1,440**

*These numbers include other species of salmon.

**Includes one sockeye salmon.

Prepared by:

Approved by:

Larry Engel
Fishery Biologist

Louis S. Bandirola
D-J Coordinator

Job Leader:

Alex H. McRea, Director
Sport Fish Division

Louis S. Bandirola
Fishery Biologist

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